

NTHU Learning Sciences and Technologies

Critical Issues in Learning

Spring 2023, 3 credits, offered in English

<https://elearn.nthu.edu.tw/course/view.php?id=24677>

Instructor: Su-Yen Chen, Professor (suychen@mx.nthu.edu.tw)

<https://nthuilst.wixsite.com/suychen/projects>

Time: Tuesday, 2, 3, 4 Location: Room 409, General Building II

Course Description

Using psychological, educational, and sociological lenses, this course will deal with critical issues in learning and learning technologies from the research community's standpoint. This discussion-based course centers around the most significant and emerging issues and examines these issues critically by employing the highly cited academic papers as vehicles for discussion. On this tentative syllabus, topics related to academic achievement, learning engagement, self-regulated learning, self-directed learning, game-based learning, learning analytics, VR in learning and education, metaverse and education, AI education, social robotics for learning, and chatbots for learning, are covered as illustrations, and highly-cited articles under each topic provided. However, a final list of topics and corresponding articles will be decided based on students' mutual interest and need. Students are encouraged to suggest topics as well as articles.

Course goals

1. To acquaint students with some of the major critical issues in learning in contemporary educational context.
2. To co-create a community of learners who explore and develop their own research interest in the field of learning sciences and technologies.
3. To develop the skills of identifying significant articles/authors within an interested area.
4. To develop awareness on how scholarly community of practice works.

Tentative schedule, topic and readings

Week	Date	Topic
1	2/14	Introduction
2	2/21	Academic achievement & Learning engagement
4	3/07	Emergent technologies and Learning: ChatGPT & metaverse
5	3/14	Academic achievement
6	3/21	Learning engagement

7	3/28	Self-regulated learning
9	4/11	Self-directed learning
10	4/18	Game-based learning
11	4/25	VR in learning and education
12	5/2	Metaverse and education
13	5/9	AI education
14	5/16	Social robotics and Chatbot for learning
15	5/23	Final Report Presentation
16	5/30	Final Report Presentation

Week 2 (2/21)

Academic achievement & Learning engagement

* What are the psychological correlates of academic achievement?

* What is learning engagement?

Richardson, M., Abraham, C., & Bond, R. (2012). Psychological correlates of university students' academic performance: A systematic review and meta-analysis. *Psychological Bulletin*, 138(2), 353–387. (cited by 3490)

Kahu, E.R. (2013). Framing student engagement in higher education. *Studies in Higher Education*, 38 (5), 758-773. (cited by 1917)

Week 4 (3/7)

Emergent technologies and Learning

* How emergent technologies (e.g. ChatGPT) might have impact on learning and education?

Zhai, X. (2022). ChatGPT user experience: Implications for education. Available at SSRN 4312418. (cited by 4)

Susnjak, T. (2022/12). ChatGPT: The End of Online Exam Integrity? arXiv preprint arXiv:2212.09292. (cited by 6)

Hwang, G. J., & Chien, S. Y. (2022). Definition, roles, and potential research issues of the metaverse in education: An artificial intelligence perspective. *Computers and Education: Artificial Intelligence*, 100082. (cited by 69)

Week 5 (3/14)

Academic achievement

* How researchers examine learning and academic achievement from the lens of psychology, sociology, teacher education, and neuroscience?

Voyer, D., & Voyer, S. D. (2014). Gender differences in scholastic achievement: A meta-analysis. *Psychological Bulletin*, 140(4):1174-204. (cited by 1276)

Park, H.; Buchmann, C.; Choi, J. and Merry, J. J. (2016). Learning beyond the school walls:

- Trends and implications. *Annual Review of Sociology*, 42, 231-252. (cited by 177)
- Kunter, M., Klusmann, U., Baumert, J., Richter, D., Voss, T., & Hachfeld, A. (2013). Professional competence of teachers: Effects on instructional quality and student development. *Journal of Educational Psychology*, 105(3), 805–820 (cited by 1385)
- Thomas, M. S. C., Ansari, D., & Knowland, V. C. P. (2019). Annual research review: Educational neuroscience: Progress and prospects. *Journal of Child Psychology and Psychiatry*, 60(4), 477–492. (cited by 159)
- Mason, L., Zaccoletti, S., Scrimin, S., Tornatora, M. C., Florit, E., & Goetz, T. (2020). Reading with the eyes and under the skin: Comprehending conflicting digital texts. *Journal of Computer Assisted Learning*, 36(1), 89-101.

Week 6 (3/21)

Learning engagement

* What is learning engagement? How different teacher-related factors are contributing to learning achievement and to learning motivation? What is the difference between actual learning and feelings of learning? And how do we look at an example regarding huge gap between educational belief of teachers and empirical support from researchers?

Deslauriers L, McCarty LS, Miller K, Callaghan K, & Kestin G. (2019). Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. *Proceeding of the National Academy of Science of the United State of America*, 116(39), 19251-19257. (cited by 650)

Hamre, B. K., Pianta, R. C., Downer, J. T., DeCoster, J., Mashburn, A. J., Jones, S. M., ... & Brackett, M. A. (2013). Teaching through interactions: Testing a developmental framework of teacher effectiveness in over 4,000 classrooms. *The Elementary School Journal*, 113(4), 461-487. (cited by 708)

Seligman, M. E. P.; Ernst, R. M.; Gillham, J.; Reivich, K.; & Linkins, M. (2009). Positive education: Positive psychology and classroom interventions. *Oxford Review of Education*, 35,(3) p293-311. (cited by 2634)

Wang, M.; Eccles, J. S. (2012). Social support matters: Longitudinal effects of social support on three dimensions of school engagement from middle to high School. *Child Development* 83(3), 877-895. (cited by 1167)

Pashler, H., McDaniel, M., Rohrer, D., & Bjork, R. (2008). Learning Styles: Concepts and Evidence. *Psychological Science in the Public Interest*, 9(3), 105–119. (cited by 3289)

Week 7 (3/28)

Self-regulated learning

* How different approaches look at learning autonomy and effective learning? How to support self-regulated learning?

- Panadero, E. (2017). A review of self-regulated learning: Six models and four directions for research. *Frontiers in Psychology*, 8, 422. (cited by 1353)
- Bjork, R.A., Dunlosky, J., & Kornell, N. (2013). Self-regulated learning: beliefs, techniques, and illusions. *Annual Review of Psychology*, 64, 417-44. (cited by 1409)
- David W. Putwain, Laura J. Nicholson & Jenna L. Edwards (2016) Hard to reach and hard to teach: Supporting the self-regulation of learning in an alternative provision secondary school. *Educational Studies*, 42(1), 1-18 (cited by 28)
- Wong, J., Baars, M., Davis, D., Van Der Zee, T., Houben, G. J., & Paas, F. (2019). Supporting self-regulated learning in online learning environments and MOOCs: A systematic review. *International Journal of Human-Computer Interaction*, 35(4-5), 356-373. (cited by 345)
- Kizilcec, R. F., Pérez-Sanagustín, M., & Maldonado, J. J. (2017). Self-regulated learning strategies predict learner behavior and goal attainment in Massive Open Online Courses. *Computers & Education*, 104, 18–33. (cited by 725)

Week 9 (4/11)

Self-directed learning

- * What is the difference between self-regulated learning and self-directed learning? How to support self-directed learning?

- Saks, K., & Leijen, L. (2014). Distinguishing Self-directed and Self-regulated Learning and Measuring them in the E-learning Context. *Procedia - Social and Behavioral Sciences*, 112, 190-198. (cited by 289)
- Grow, G. O. (1991). Teaching learners to be self-directed. *Adult education quarterly*, 41(3), 125-149. (cited by 2096)
- Beckers, J., Dolmans, D., & Van Merriënboer, J. (2016). e-Portfolios enhancing students' self-directed learning: A systematic review of influencing factors. *Australasian Journal of Educational Technology*, 32(2), 32-46. (cited by 139)
- Chen, C. H., Chen, K. Z., & Tsai, H. F. (2022). Did Self-Directed Learning Curriculum Guidelines Change Taiwanese High-School Students' Self-Directed Learning Readiness? *The Asia-Pacific Education Researcher*, 31(4), 409-426. (cited by 4)

Week 10 (4/18)

Game-based learning

- * Game-based learning as an effective tool

- Jan L. Plass, Bruce D. Homer & Charles K. Kinzer (2015) Foundations of game-based learning. *Educational Psychologist*, 50(4), 258-283 (cited by 983)
- Qian, M., & Clark, K. R. (2016). Game-based Learning and 21st century skills: A review of recent research. *Computers in Human Behavior*, 63, 50–58. (cited by 893)

- Krath, J.; Schürmann, L.; von Korfflesch, H.F. (2021). Revealing the theoretical basis of gamification: A systematic review and analysis of theory in research on gamification, serious games and game-based learning. *Computers in Human Behavior*, 125, 106963 (cited by 78)
- Swacha, J. (2021). State of research on gamification in education: A bibliometric survey. *Education Sciences*, 11(2), 69. (cited by 56)
- Acquah, E., & Katz, H. (2020). Digital game-based L2 learning outcomes for primary through high-school students: A systematic literature review. *Computers and Education*, 143, 103667 (cited by 38)
- Hassan, A., Pinkwart, N., & Shafi, M. (2021). Serious games to improve social and emotional intelligence in children with autism. *Entertainment computing*, 38, 100417. (cited by 14)
- Tlili, A. et al., (2021). A Smart Collaborative Educational Game with Learning Analytics to Support English Vocabulary Teaching. *International Journal of Interactive Multimedia and Artificial Intelligence*, Vol. 6(6), 215-224.

Week 11(4/25)

VR in learning and education

* The trend and issues regarding VR in learning and education

- Merchant, Z., Goetz, E. T., Cifuentes, L., Keeney-Kennicutt, W., and Davis, T. J. (2014). Effectiveness of virtual reality-based instruction on students' learning outcomes in K-12 and higher education: a meta-analysis. *Comput. Educ.* 70, 29–40. (cited by 1448)
- Radianti, J., Majchrzak, T. A., Fromm, J., & Wohlgenannt, I. (2020). A systematic review of immersive virtual reality applications for higher education: Design elements, lessons learned, and research agenda. *Computers & Education*, 147, 103778(cited by 849)
- Parong, J., and Mayer, R. E. (2018). Learning science in immersive virtual reality. *J. Educ. Psychol.* 110, 785–797. (cited by 322)

Week 12 (5/2)

Metaverse and education

* What is Metaverse, and its relationship with education?

- Lee, L.-H., et al. (2021). All one needs to know about metaverse: A complete survey on technological singularity, virtual ecosystem, and research agenda. *ArXiv*, vol./2110.05352 (cited by 180)
- Park, S. M., & Kim, Y. G. (2022). A Metaverse: taxonomy, components, applications, and open challenges. *IEEE Access*. (cited by 143)
- Lee, L. H., Lin, Z., Hu, R., Gong, Z., Kumar, A., Li, T., ... & Hui, P. (2021b). When creators meet the metaverse: A survey on computational arts. *arXiv preprint arXiv:2111.13486*. (cited by 21)

- Messinger, P. R., Ge, X., Smirnov, K., Stroulia, E., & Lyons, K. (2019). Reflections of the extended self: Visual self-representation in avatar-mediated environments. *Journal of Business Research*, 100, 531-546. (cited by 31)
- Lu, Z., Shen, C., Li, J., Shen, H., & Wigdor, D. (2021). More kawaii than a real-person live streamer: understanding how the otaku community engages with and perceives virtual YouTubers. In Proceedings of the 2021 CHI Conference on Human Factors in Computing Systems (pp. 1-14). (cited by 23)
- Choudhry, A., Han, J., Xu, X., & Huang, Y. (2022). " I Felt a Little Crazy Following a'Doll'" Investigating Real Influence of Virtual Influencers on Their Followers. Proceedings of the ACM on Human-Computer Interaction, 6(GROUP), 1-28. (cited by 3)
- Duan, H. et al. (2021), Metaverse for social good: A university campus prototype. in Proceedings of the 29th ACM International Conference on Multimedia, ser. MM '21. New York, NY, USA: Association for Computing Machinery, p. 153–161. (cited by 160)

Week 13 (5/9)

AI education

- Chiu, T. K., Meng, H., Chai, C. S., King, I., Wong, S., & Yam, Y. (2021). Creation and evaluation of a pretertiary artificial intelligence (AI) curriculum. *IEEE Transactions on Education*, 65(1), 30-39. (cited by 35)
- Dodero, J. M. (2021). AI curricular framework, competency-based curriculum framework and analysis of master course, P. 22-53. Artificial intelligence masters' programmes- An analysis of curricula building blocks (No. JRC123713). the Joint Research Centre (JRC), the European Commission's science and knowledge service.
- Lin, C. H., Yu, C. C., Shih, P. K., & Wu, L. Y. (2021). Stem based artificial intelligence learning in general education for non-engineering undergraduate students. *Educational Technology & Society*, 24(3), 224-237. (cited by 15)
- Pisoni, G., Díaz-Rodríguez, N., Gijlers, H., & Tonolli, L. (2021). Human-Centered Artificial Intelligence for Designing Accessible Cultural Heritage. *Applied Sciences*, 11(2), 870. (cited by 21)

Week 14 (5/16)

Social robotics & Chatbot for learning

* Social robots as emergent technologies for learning

- Belpaeme, T., Kennedy, J., Ramachandran, A., Scassellati, B., & Tanaka, F. (2018). Social robots for education: A review. *Science Robotics*, 15;3(21): eaat5954. (cited by 711)
- van den Berghe, R.; Verhagen, J.; Oudgenoeg-Paz, O.; van der Ven, S.; Leseman, P. (2019). Social robots for language learning: A review. *Review of Educational Research*, 89 (2), 259-295 (cited by 167)

Tlili, A., Lin, V., Chen, N.-S., Huang, R., & Kinshuk. (2020). A Systematic Review on Robot-Assisted Special Education from the Activity Theory Perspective. *Educational Technology & Society*, 23 (3), 95-109. (cited by 12)

* Chatbot as emergent technologies for learning

Fryer, L. K., Ainley, M., Thompson, A., Gibson, A., & Sherlock, Z. (2017). Stimulating and sustaining interest in a language course: An experimental comparison of Chatbot and Human task partners. *Computers in Human Behavior*, 75, 461–468. (Cited by 193)

Fryer, L. K., Nakao, K., & Thompson, A. (2019). Chatbot learning partners: Connecting learning experiences, interest and competence. *Computers in Human Behavior*, 93, 279–289. (cited by 139)

Huang, W., Hew, K. F., & Fryer, L. K. (2022). Chatbots for language learning—Are they really useful? A systematic review of chatbot-supported language learning. *Journal of Computer Assisted Learning*, 38(1), 237-257. (cited by 26)

Ahmad, R., Siemon, D., Gnewuch, U., & Robra-Bissantz, S. (2022, January). A Framework of Personality Cues for Conversational Agents. In *Proceedings of the 55th Hawaii International Conference on System Sciences*. (cited by 2)

Mehra, B. (2021). Chatbot personality preferences in Global South urban English speakers. *Social Sciences & Humanities Open*, 3(1), 100131. (cited by 5)

Gao, C., Lei, W., He, X., de Rijke, M., & Chua, T. S. (2021). Advances and challenges in conversational recommender systems: A survey. *AI Open*, 2, 100-126. (cited by 75)

Week 15 (5/23)

Final Report Presentation

Week 16 (5/30)

Final Report Presentation

Evaluation

1. Presentation and Leading Discussion 45 %

Everyone must select three articles from the above class reading list and conduct three paper presentations and leading discussions. When it's your turn to be the leader, please read through reflection notes posted by classmates on eLearn before the class and incorporate those ideas into your presentations and discussions. Since this course will be largely discussion-based, a traditional “seminar-like” paper presentation will not be the preference. Instead, please prepare it in a way that allows the class to participate and exchange ideas with a high engagement rate.

(Self-selected articles are welcomed, class reading list and time schedule might be adjusted based on class discussion, and final syllabus provided at the third week.)

2. Reflection notes and classroom participation 20% (at least 10 posts)

Everyone must post reflection notes about the assigned reading articles of that week on eLearn 24 hours before the next class. It's not necessary to be very insightful or creative; however, it must manifest that you have read the paper and done the hard work necessary.

3. Final project: literature review or research proposal 35%